USB 4Port Hub

User’s Guide

version 1.00

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Introduction

The USB 4Port Hub, an Universal Serial Bus (USB) interface which is a 12-Mb/s or 1.5Mb/s, multiplexed serial bus for low to medium bandwidth PC peripherals (e.g., Keyboards, printers, scanners, and mice). The USB interface supports dynamic attach-detach (hot Plug-unplug) of peripherals.

The USB specification defines the following five classes of devices, each differentiable by power consumption requirements:

- Bus - powered hubs (BPH)
- Self - powered hubs (SPH)
- Low power, bus-powered functions
- high power, hub-powered functions
- Self - powered functions

Definitions

Bus - powered hub Bus - powered hubs (BPH) obtain all power from upstream port and often contain a nonremovable function. One typical BPH application is a keyboard.
Current limit USB specification requires SPHs to limit current to downstream data traffic from the hub.
Downstream port - A port that is electrically further from the host and generates downstream data traffic from the hub.
High-power, Bus-powered function - All power to these devices comes from the upstream port. Its current draw can be 1 unit load before configuration and up to 4 unit loads after configuration.
Host - the host computer system where the USB host controller is installed.
Low-power, bus-powered function - All power to these devices comes from the upstream port. Its current draw is less than 1 unit load.
Self-powered function - Many draw up to 1 unit load from the upstream port. The remainder of power is provided from a local power supply.
Self-powered hub - Self-powered hub (SPH) have a local power supply that power nonremovable function and downstream port. Typical self-powered hubs are PCs, monitors, printers, and stand alone hubs. The SPH is required to have current limit and report overcurrent conditions. The SPH must be able to supply 4 unit loads to all external downstream ports even when the hub is in s suspended state.
Upstream port - The port on a device that is electrically closer to the host and generates upstream data traffic from the hub.

Features

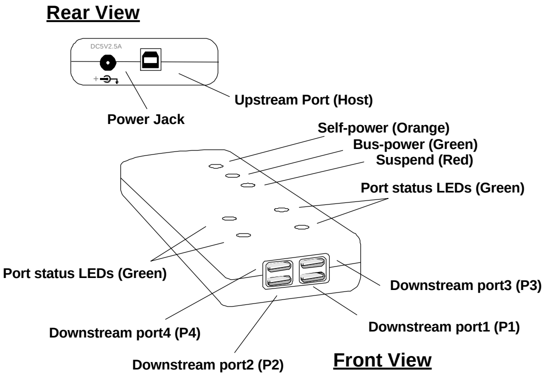
- Universal Serial Bus (USB) Version 1.1 Compliant
- Plug-and-Play
- Connects upto 127 USB devices with cascading hub
- Integrated USB Transceivers
- One Upstream port (host) and Four Downstream ports (P1, P2, P3, P4)
- Two power Source Modes
  - Self-powered Mode
  - Bus-powered Mode
- Power Auto Switching and Overcurrent Protection
- Suspend Status Terminal Available for External Logic Power Down
- All downstream ports Support Full-Speed and Low-Speed Operations
- Supports Suspend and Resume Operations
- 3.3-v Operation

Specifications

Standards:	USB Specification V1.1
Data Speed:	Low: 1.5Mbps High: 12Mbps
Upstream port:	Series-B Receptacle x 1
Downstream ports:	Series-A Receptacle x 4
Legacy ports:	
Output Voltage:	Per port DC+5V
Output Current:	Per port 500mA
External Power:	DC 5V/2.5A
EMI Compatibility:	FCC Class B CE Certification, Class B, VCCI-II
Dimensions:	
Storage Temperature:	-25°C ~ 70°C
Operation Temperature:	0°C ~ 50°C
Operation Humidity:	10% ~ 70% non-condensing
Power Consumption:	20 Watts (maximum)

LED Indicators

The 4-Port Multifunction USB Hub is equipped with 7 LED indicators:



Green Active Lights:

Each green ACTIVE light is associated with the port by which it is grouped. If a peripheral (i.e. mouse, scanner) is attached to the port and ACTIVE light goes out, the peripheral may be defective or static discharge could have switched the port off.

Orange Self-power Light:

The orange SELF POWER light means that power is being taken from 120V AC line cord plugged into the wall. Your Hub Master can operate all four ports at full power when plugged into the wall.

Green Bus-power Light:

The green BUS POWER light means that power is being taken from your Computer or another Hub and delivered through the USB cable to Hub Master. Your Hub Master is operating at reduced power capability and may not run all peripherals.

RED Suspend Light:

The red SUSPEND light means YOUR computer has suspended (put into low power mode) the Hub. Your Hub is waiting to be awakened. In MOST instances this is not a problem; however, sometimes, it cannot awaken because your drivers get corrupted. If you not low on battery power and rebooting does not turn off the suspend light, you might try refreshing your drivers. A detective peripheral is one thing that can cause an unrecoverable suspended state that requires driver refresh.

The red SUSPEND light will be on if the Uplink cable is not connected to the computer, neither upper level hub.

Port status LED:

LED on: Power Active
LED off: Overcurrent

Automatic Switching:

Between Bus Power (Powered by your Host - either a computer or a Hub) and Self-Powered (Powered by AC Adapter plugged into the wall) states. The order by which the hub is powered is not important, the automatic circuitry makes installing and using the Hub a simple task. The switching will always switch over to the higher power source and notify your computer that the power source has changed.

Architecture Benefits

- Power interface allows system flexibility
  - Bus or Self powered
- Internal oscillator
  - Oscillator
  - External crystal
- On-chip command decoder
  - Ensure reliable responses to host requests
  - Enable stand-alone solution

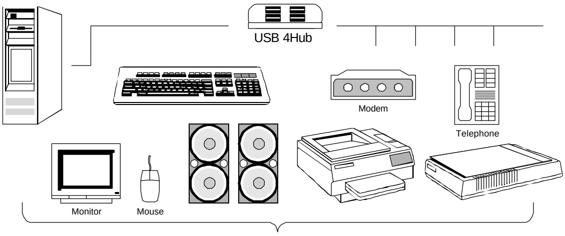
Competitive Advantages

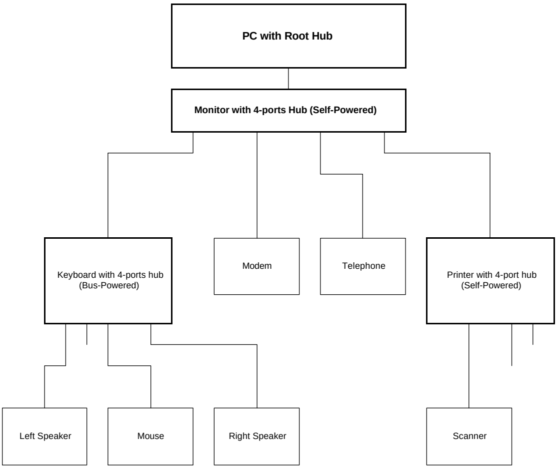
- Compatibility, Compatibility, Compatibility,
- One chip solution
- No Microcontroller or firmware needed
- Integrated USB Transceivers
- Works “out of box” with Windows 98 driver

Hardware Description

The USB 4Port Hub that provides one upstream port and four downstream ports in compliance with the 1.1 Universal Serial Bus (USB) specification. Because this hub is implemented with a digital state machine instead of a Microcontroller, no software programming is required. Fully compliant USB transceivers are in integrated into the ASIC for all upstream and downstream ports. The downstream ports support both full-speed and low-speed devices by automatically setting the slew rate according to the speed of the device attached to the ports.

A major advantage of USB is the ability to connect 127 functions configured in up to 6 logical layers (tiers) to a single personal computer.




PC with Root Hub
Monitor with 4-ports Hub (Self-Powered)
Keyboard with 4-ports hub (Bus-Powered)
Modem
Telephone
Printer with 4-port hub (Self-Powered)
Left Speaker
Mouse
Right Speaker
Scanner

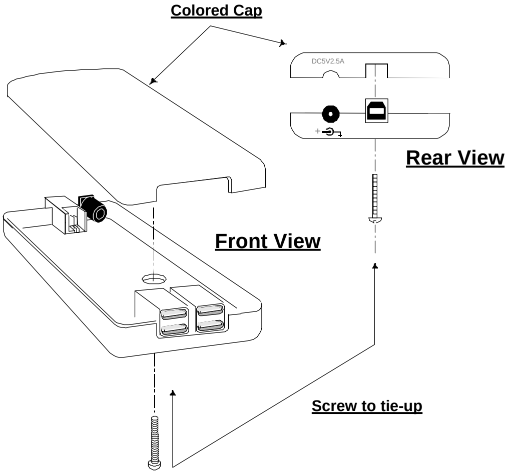
USB Tiered Configuration Example

Another advantage of USB is that all peripherals are connected using a standardized 4-wire cable which provides both communication and power distribution. Three power configurations are Bus-Powered, Self-Powered and High-Power mode. A Bus-Power mode, a hub must always be connected downstream to a Self-Powered hub unless it is the only hub connected to the PC and there are no High-Powered functions connected downstream. In the Self-Power mode, the hub is connected to its own power supply. High-Powered functions may draw a maximum of 500mA and may only be connected downstream to Self-Powered hubs.

Both Bus-Powered and Self-Powered hubs requires over-current protection for all downstream ports. Individual port management requires power management devices for each individual downstream port, but adds robustness to your USB system because, in the event of an over-current condition, the USB Host will only power-down the port that has the condition. The ganged configuration uses fewer power management devices and thus has lower system costs, but in the event of an over-current condition on any of the downstream ports, all the ganged ports will be disabled by the USB Host.

Change Colored Cap

It is easy to change the colored cap of the hub if you want that match to other peripherals.



Safety Precautions

- Always unplugged AC-DC power adapter and all cords from the hub when you try to open the case.
- Do not open the case of the hub if it connected with any peripheral.
- Use the AC-DC power adapter comes with the hub only.
- If the hub starts emitting unusual smells, sounds, or smoke, unplug the unit immediately from it’s power

supply. Stop using it and contract the store where it was purchased from.

- Always hold the plug when unplugging the cable from the hub. Do not pull the cord section to prevent any damage caused.
- Disconnect the AC-DC power adapter if the hub will not be in used for a long period of time.
- Do not expose the hub to a location of high humidity, high temperature, direct sunlight, excessive dust / moisture, or strong magnetic field.
- Do not touch the hub or cable with wet hand to prevent an electric shock. Should the hub becomes wet, unplug it from it's power source before handing.
- Any modifications done to the hub by any unauthorized personnel will void the warranty.
- Any damage, electric shock, fire or loss of function resulting from any unauthorized modifications done to the hub will not be the responsibility of the manufacturer.

Installation

Power Mode Setting

The USB 4Port Hub supports both self-powered and bus-powered modes.
Self-powered modem (recommended mode) receives power from power adapter and provides each downstream port with DC+5V, 500mA (max.) power supply.
Bus-powered mode receives power from USB bus and provides all four ports with DC +5V, 500mA (max.) power supply in total.

Note: In the configuration of cascading several USB hubs, all hubs must use self-powered mode. Only the lowest tiered hub, which USB devices are connected to, can use the bus-powered mode.

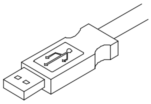
Hub Installation

Proceed with the following instructions to setup the hub:

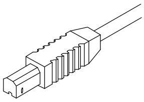
1. If using self-powered mode (default setting), insert the AC-DC power adapter into the power jack on the back of

the hub. For bus-powered mode, no power adapter is required.

2. Plug the Series - A connector of the USB cable into either a system build-in USB port or USB host adapter installed in your system. If using cascading configuration, connect the Series - A connector into any one of the downstream ports of the upper level hub.
3. Plug Series - B connector of USB cable into the upstream port (Root Port) of the hub. (If you plan to use the system build-in USB port, make sure the port is fully compatible to USB standard. If you are not sure, contact your system manufacturer.)
4. Plug the Series - A connector of any USB device, such as USB printer, scanner, CF or SM memory card reader into any one of the downstream ports on the hub.
5. The new connected device(s) will be automatically detected. Refer to the device user’s manual to install drivers / utility software (if needed) for proper operation.



Series - A connector



Series - B connector

Frequently Asked Questions

Universal Serial Bus - Frequently Asked Questions

What is USB?

- USB stands for Universal Serial Bus. It is a standard that has been adopted by leading manufacturers within the computer industry to define a new type of peripheral connection scheme. It is designed to replace older parallel and serial ports, cables, and connectors with something faster and easier to use.
- USB is made up of a number of parts. At the core, your computer must be running an operating system that supports USB (A PC with Windows 98, or the Apple iMac). Your

computer will act as the host for the USB bus. This means that the computer becomes responsible for communicating with all attached USB devices so that it knows what to do with them, what they are doing, etc.

- USB peripherals (like mice, keyboards, joysticks, scanners, printers, cameras, speakers, network adapters, etc.) can be either attached directly to a PC via USB ports built onto your computer or provided by either bus-powered or self-powered USB hubs. The host (your computer) then recognizes the device when attached, loads any necessary drivers, and lets you use the device without even having to reboot. If you decide to attach a different device you can simply unplug the connected device, attach the new one and it too will be automatically recognized repeating the cycle.
- USB will use a single cable and type connector types. The "A" type or downstream connector will always be plugged into the direction of your peripherals. The "B" type or upstream connector will always be plugged in the direction of your computer. For example, in a configuration with a computer, 2 USB hubs, and a USB mouse the connection will be as follows: the computer's "A" connector will connect to first USB hub "B" connector, one of the first USB hub's "A" connectors will plug into the second USB hub's "B" connector, and the mouse will be plugged into the second hub's "A" type connector. ([computer]A - >> B [1st Hub] A - >> B [2nd Hub] A - >> mouse.
- Additionally USB can provide up to 500mA of power to connected device. This will help to eliminate the need for separate power supplies for peripheral.

What are the benefits of USB?

- Easier to add new peripherals – Windows 98 will automatically recognizes devices when you plug them in.
- Quicker installation of new peripherals – You won't have to reboot during installation.
- Faster – Top USB data speed is around 100 times faster than the fastest serial connection.

- Greater Expandability – U sing USB hubs you can connect up to 127 devices to your serial ports, parallel ports, or IRQ's on your computer.
- Hot Swappable – Changing connected USB devices is as changing as light bulb, just disconnect the old and plug in the new. No need to power down of fumble with drivers. They just plug and go!
- Eliminates need for external power supplies – fewer plugs to deal with, and lower cost peripherals.
- Meets OnNow industry initiative guidelines – will help to build a future where the computer will be able to better manage power consumption and more seamlessly integrate into our lives.
- Lower peripheral costs – will help drive down the cost of computer peripherals by eliminating external power supplies, allowing manufacturers to standardize their products to a single connector, creating a large customer base by providing the same peripherals for Macs, PCs, and portables, and reducing returns due to wrong connector types.

What is a USB Hub?

- A USB hub typically consists of a single upstream port (designed to connect directly to your computer or to another hub) and multiple downstream ports. Jaton provides both 4-port and 7-port models. It allows you to expand the number of devices you can attach to your computer.

How many USB Hubs can I connect together?

- In total you should only connect 5 tiers of USB hubs together. A tier is defined by the number of hubs a device's signal must pass through before it reaches to host. For example, using the USB hub, you could connect a theoretical maximum of 341 hubs in five tiers, this would leave you with an incredible 1024 ports to connect USB devices! But you should only connect 127 devices together at any time.

- Do not add a 6th tier of USB hubs. This would violate the hub cascading rules, and the signals from any devices attached may not function properly.
- Be careful of any compound devices when attaching USB hubs together, they count as tiers too.

What is a USB compound device?

- A USB Compound device is defined as a combination of a USB function or functions with a USB hub. A good example would be a USB keyboard that has an additional USB port for a mouse to be attached. Even though the keyboard is a peripheral (a function), it is also a hub because you can attach another USB device to it. Effectively the keyboard has a hub inside.

What is the difference between self-powered and bus-powered USB hubs?

- A self-powered hub plugs into an electrical outlet with AC adapter that provides better power for USB connected devices. Only low power USB devices can be connected to a bus-powered hub (like mice and keyboards). A self-powered hub will allow you to safely connect other devices that require up to the full 500mA outlined in the USB specification.

What kind of cables do I use with USB ?

- USB cable will usually have both “A” type (downstream) and “B” type (upstream) connectors. Unshielded USB cables running at 1.5Mb will have a maximum cable length of 3 meters. This simple scheme will ensure that users will not be able to plug cables in wrong, since the connectors are unique in size and shape.

Will Firewire™ (IEEE 1394) replace USB?

- NO. Although IEEE 1394 is a faster standard for connecting peripherals, it is also much more expensive as a technology. In the future both USB and Firewire™ will combine to meet the needs of computer users as complimentary technologies. Firewire™ will be used to connect high-speed video cameras, external hard drives, and other devices that need more than 12MB of bandwidth. USB will survive to support printers, scanners, joysticks, modems, keyboards, mice, and other lower speed devices. At approximately 100 times faster than today's serial port, USB is in a strong position to give a greater level of speed to users at a much more attractive price,

Will Jaton make any network products that support USB?

- Yes. Aside from a full line of USB devices that will quickly and easily allow you to connect USB peripherals to your computer, Jaton will begin integrating USB into its networking products as well.

how can I connect 2 PCs to each other with USB?

- There are number of USB bridges on the market. These devices allow a direct connection between 2 PCs via their USB ports.
- USB bridges are limited in their functionality. They effectively work by accessing a shared piece of memory built into the bridge. Proprietary software is necessary to allow various computer resources to be shared. With Ethernet , Jaton USB XpressNet, or Jaton USB ConNet and USB ConNetLan are native support in Windows 98 allows you to quickly share printers and CD, DVD, and hard Drives. With a simple addition of WEB proxy software, you can also share Internet access.

Technical Assistance

Refreshing your HUB drivers and determining if there is a faulty peripheral:

- Unplug all your peripherals from the Hub Master.
- Plug the Hub into 120V AC. (SELF POWER)
- Plug your Hub into your Computer’s USB port using the USB cable provided with your USB 4Port Hub.

If the Suspend light goes on again: The Windows USB drivers need to be reloaded. Your Hub is OK.

If the Suspend light doesn’t go on: Plug in your peripherals one by one; find which one suspends the Hub Master.

Note: You may find after plugging everything back in, that nothing caused the problem, and everything now works. It is rare, but possible, to corrupt your Windows drivers while plugging devices into your computer’s USB port. You actually fixed the problem when you Removed / Refreshed your Windows Drivers.

Steps for reloading Windows USB driver:
(you may need your windows 98 installation CD for this procedure.)

1. Click START → then SETTINGS → then CONTROL PANEL.
2. Double Click on the “System” icon.
3. Click DEVICE MANAGER the scroll down to the “Universal Serial Bus Controller” icon.
4. Click on the + sign to the left of “Universal Serial Bus Controller”.
5. Click on “ USB Root Hub” → then “Remove” → then “OK”, when asked if you want to remove the driver.
6. Click on “Refresh”. (Your computer will now refresh your drivers and the suspend light should go off)

NOTE: Because the SUSPEND light is such a good diagnostic tool, USB 4Port Hub has decided to power the SUSPEND light during BUS POWER mode. This means that under suspended operation (typically a laptop preserving power) your SUSPEND and BUS POWER lights will operate.

Limited Warranty.

Manufacturer warrants that the products sold hereunder are free from defects in material and workmanship for a period of two (2) years from manufacturing date. This limited warranty applies only to the original purchaser of Jaton Product and is not transferable. This limited warranty does not apply if failure to the Product Registration, or over thirty (30) days from purchase (original invoice date). This Limited Warranty does not cover any incompatibilities due to the user's computer, hardware, software or any related system configuration in which the Jaton Products interfaces. Proof of purchase will be required before any consideration by Manufacturer occurs.

Other Limits.

The forgoing is in lieu of all other warranties, expressed or implied. Including but not limited to the implied warranties of merchantability and fitness for a particular purpose. Manufacturer does not warrant against damages or defects arising out of improper or abnormal use of handling of the products; against defects or damages arising from improper installation (where installation is by persons other than Manufacturer), against defects in products or components not manufactured or installed by Manufacturer, or against damages result from non-manufacturer made products or components. This warranty does not apply if the Product has been damaged by accident, abuse, or misuse. This warranty also does not apply to products upon which repairs have been effected or attempted by persons other than pursuant to written authorization by Manufacturer.

Exclusive Obligation.

This warranty is exclusive. The sole and exclusive obligation of Manufacturer shall repair or replace the defective products in the manner and for the period provided above. Manufacturer shall not have any other obligation with respect to the Products or any part thereof, whether based on contract, tort, strict liability or otherwise. Under no circumstances, whether based on this Limited Warranty or otherwise, Manufacturer shall not be liable for incidental, special, or consequential damage.

Other Statements.

Manufacturer's employees or representatives' **ORAL OR OTHER WRITTEN STATEMENTS DO NOT CONSTITUE WARRANTIES**, shall not be relied upon by Buyer, and are not a part of the contract for sale or this Limited Warranty.

Terms and Conditions.

Direct Jaton Customer:	This warranty applies only for a period of two (2) years from purchase date of Jaton original invoice.
Reseller/ Vendor:	This warranty applies only for a period of two (2) years from manufacturing date.
Registered User:	This warranty applies only for a period of two (2) years from purchase date and register within 30 days of

	purchase date from legal reseller.
Others:	If the products do not conform to this Limited Warranty (as herein above described), Manufacturer will charge services fee such as repair, replacement whether based on its costs. Shipping and installation of the replacement Products or replacement parts shall be at User's expanse.

Services agreement:

(1) All applicants shall complete service request form from Manufacturer.
(2) All returned checks will be charged a $20.00 fee by Manufacturer.
(3) All repair and replacement services allow 4-6 weeks from the date of receiving by Manufacturer.
(4) All products without warranties require service processing fee $20 (payment in advance), which is not refundable.

Entire Obligation.

This Limited Warranty states the entire obligation of Manufacturer with respect to the Products. If any part of this Limited Warranty is

determined to be void or illegal, the remainder shall remain in force and effect. Some states do not allow limitation of implied warranties, or exclusive or limitation on product incidental or consequential damages, so above limitation may not apply to you. This warranty gives you specific legal rights. You may have other rights which may vary from state to state.
This warranty applies only to this product, and is governed by the law of the State of California.

Reducing Warranty Claim Rejections.

To reduce the potential of incurring damages not covered by Manufacturers warranties, we strongly recommend the following:

- read your manuals before installing peripherals and/or before making changes to the machine's configuration;
- ask your dealer if there are any known problems with the system requirements or installation procedures for any add-on products that your are purchasing;
- buy industry standard products where compatibility issue are more likely to surface;
- If you are unsure about installation for a new product, contact your dealer's service department.

We believe it is important for you to know and understand what your warranty coverage provides and what it does not.

We also want you to be aware that most hardware warranties only cover the functions of the hardware. In most cases, no assurances are given by the manufacturer that the hardware item will work in conjunction with any other hardware item. If a computer product is not working because it is not compatible with another product, or because it has not been properly installed and set-up, the manufacturer does not pay for the service time. To help avoid these inconveniences, contact a professional consultant that can help you determine the possibility of incompatibility issue before you purchase add-on products or accessories.

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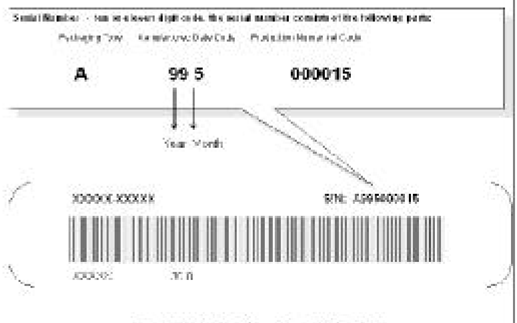

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